09-0700

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Itzhak, David
Docket: 9124.118US01
Title: WATER TREATMENT METHOD AND APPARATUS

CERTIFICATE UNDER 37 CFR 1.10
'Express Mail' mailing label number: EL674896816US
Date of Deposit. September 6, 2000
I hereby certify that this paper or fee is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

By: Linda McCormick
Name: Linda McCormick

BOX PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

We are transmitting herewith the attached:

- ☒ Transmittal sheet, in duplicate, containing Certificate under 37 CFR 1.10.
- ☒ Utility Patent Application: Spec. 12 pgs; 16 claims; Abstract 1 pgs.
  The fee has been calculated as shown below in the 'Claims as Filed' table.
- ☒ 1 sheets of formal drawings
- ☒ Small entity status will be established at a later date
- ☒ An unsigned Combined Declaration and Power of Attorney
- ☒ A check in the amount of $345.00 to cover the Filing Fee
- ☒ Other: Communication Regarding Change of Correspondence Address, Preliminary Amendment
- ☒ Return postcard

CLAIMS

Number of Claims Filed		In Excess of:		Number Extra		Rate		Fee
Basic Filing Fee								$345.00
Total Claims								
14	-	20	=	0	x	18.00	=	$0.00
Independent Claims								
3	-	3	=	0	x	78.00	=	$0.00
MULTIPLE DEPENDENT CLAIM FEE								$0.00
TOTAL FILING FEE								$345.00

Please charge any additional fees or credit overpayment to Deposit Account No. 13-2725. A duplicate of this sheet is enclosed.

By:
Name: Gregory A. Sebald
Reg. No.: 33,280
Initials: GAS/rw

MERCHANT & GOULD P.C.
P.O. Box 2903, Minneapolis, MN 55402-0903
(612) 332-5300

23552
PATENT TRADEMARK OFFICE

(PTO TRANSMITTAL - NEW FILING)

S/N unknown PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Itzhak, David	Serial No.:	unknown
Filed:	concurrent herewith	Docket No.:	9124.118US01
Title:	WATER TREATMENT METHOD AND APPARATUS		

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By: Linda McCormick
Name: Linda McCormick

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment:

IN THE CLAIMS

In claim 4, line 1, please delete "or 3".

In claim 5, line 1, please delete "tp 4".

In claim 7, line 1, please delete "or 6".

In claim 8, line 1, please delete "to 7".

In claim 10, line 1, please delete "to 9".

Please cancel claim 15.

Please cancel claim 16.

REMARKS

The above preliminary amendment is made to remove multiple dependencies and avoid other rejections with regard to form.

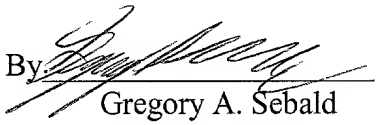
Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Gregory A. Sebald (Reg. No. 33,280), at (612) 336.4728.

Respectfully submitted,

MERCHANT & GOULD P.C.
P. O. Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300

Dated: September 6, 2000

By: 
Gregory A. Sebald
Reg. No. 33,280

GAS/rw

WATER TREATMENT METHOD AND APPARATUS

Field of the Invention

The present invention relates to water treating systems. Particularly, the invention relates to a method and apparatus for the utilization of wastewater.

Background of the Invention

The problem of scale is inherent to all systems in which there is a flow of water that contains any of Ca^{++} and Mg^{++} ions together with any of OH^-, $CO_3^=$, HCO_3^-, $SiO_3^=$, $SO_4^=$ or $PO_4^=$. Under certain temperature and pH conditions, carbonates, silicates, sulfates, phosphate and hydroxide salts precipitate and cause blockage of nozzles, reduction of cross-section area of pipes, heat insulation and underdeposit corrosion. The well-known methods of removing scale from aqueous liquids are reverse osmosis and ion exchange. Another method for removing scale is direct current (DC) electrolysis. US 4,384,943 discloses a method of fluid treatment which comprises applying DC current to aqueous liquids.

Electrolytic treatment of aqueous fluids to produce biocides is well known in the art. For example, US 4,384,943 describes such a treatment which comprises maintaining in the fluid a compound that is electrochemically decomposable to yield bromine, chlorine or iodine and/or by decomposing water to produce biocidally active O_2 or O_3 oxidants.

US 5,424,032 describes a method of treating water using innocuous chemicals for the treatment of microorganisms, or employing ultraviolet light or electrolysis in order to destroy microorganisms.

In a copending patent application by the same applicant hereof, WO 99/16715, the description of which is entirely incorporated herein by reference, there is described a method of treatment of aqueous media, comprising applying to said aqueous medium in an electrolytic cell an electrical direct current of a magnitude and at a flow-rate of the liquid in said electrolytic cell such that a combined effect of scale removing and disinfecting is achieved.

WO 99/16715 further provides an aqueous fluid treatment device for scale removing and disinfecting comprising an electrolytic cell operated by a direct current source, said electrolytic cell being adapted to allow an aqueous medium to circulate therethrough.

The term "disinfecting", as used herein, means destroying various types of microorganisms to the extent that this prevents the formation of biological fouling, and disinfection of drinking water or of water for use in bathing.

Since scale removing and scale preventing are related processes, each of the terms "scale removing" and "scale preventing" herein mean both scale removing and scale preventing.

However, all prior art methods and apparatus suffer from the severe drawback that they require, in order to operate, to utilize substantially non-polluted water, since the addition of impure water leads to operational problems, to high purifying chemicals demand, and to undesirable disposal of waste. Particularly undesired, according to the known art, is the use of water containing organic contaminants. Thus, essentially clean water is wasted, e.g., for operating cooling towers, while waste water from the tower and other industrial or urban sources has to be treated prior to disposal, in an expensive manner.

Cooling towers cannot use water with a high content of organic and biologic materials, since the resulting biofouling, developing as a matter of hours, initially reduces the efficiency of the tower, and eventually may lead to a clogging of the tower's fill.

It has now been surprisingly found, and this is an object of the invention, that it is possible to utilize waste water to operate cooling tower and related equipment, including high organic and biological loads, thereby obtaining the dual result of exploiting less expensive water for operation, and reducing the emission of industrial and urban wastes. For the

purpose of illustrating the invention, it could be mentioned that a cooling tower operating according to invention, which utilizes a make-up of 330 m^3 of wastewater every day (e.g., from an industrial plant), reduces the emission of waste to a mere 30 m^3 a day, by employing the present invention, the remaining water being evaporated. Thus, instead of treating large volumes of diluted wastewater, only small amounts (less than 10%) of concentrated waste is to be treated. This also results in a lower demand for wastewater treatment volumes.

It is an objet of the invention to provide a method for the utilization of wastewater, which overcomes the aforementioned drawback of the prior art.

It is another object of the invention to provide apparatus, particularly cooling tower apparatus that employs impure water.

Other objects of the invention will become apparent as the description proceeds.

Summary of the Invention

In one aspect the invention is directed to a method of operating a cooling tower, comprising feeding to said cooling tower a make-up stream of water containing organic and/or biological contaminants, causing a side stream taken from the recirculating stream to pass through an

electrolytic cell, removing solids precipitating by the action of said cell, and remixing said treated side stream with the main stream, before feeding them to the cooling tower.

According to a preferred embodiment of the invention, the recirculating water is further oxidized by the addition of an oxidizing material. Addition of the oxidant is preferably, but non-limitatively, effected in an amount suitable to maintain the Redox potential at the inlet of the cooling tower in the range of about 300 - 400 mV. Illustrative and non-limitative examples of suitable oxidants include NaClO, TCCA, BCDMH, Br_2 and Cl_2.

According to another preferred embodiment of the invention, a non-oxidizing biocide is added to the recirculating stream as an aid in the prevention of biofouling. Preferably, but non-limitatively, the biocide is added when the Redox potential decreases to a value of about 200 mV or less due to high organic load. Illustrative and non-limitative examples of suitable non-oxidizing biocides include phenolic biocides, quaternary amines, triazolin, DBNPA (dibromonitrilproprionamide), MIT (methyl izothiazolinone) or MBT (Methylene Bis Thiocyanate).

As will be appreciated by the skilled person, the COD of the make-up stream, at high COD values, is typically not less than about 500 and only at peak times reaches over 2,000 ppm. Normally, however, the COD of

the make-up stream is maintained between 500 and 1000 ppm. As will be appreciated by the skilled person, the invention is not limited to CODs of 500 and above, and can of course operate at lower CODs. However, the advantages attained by the invention are even more enhanced when high CODs, or 500 or more are used, which are unheard of in the art of operating cooling towers.

According to a preferred embodiment of the invention, the Redox potential of the stream entering the cooling tower is in the range 300 - 400 mV.

In another aspect the invention is directed to a cooling tower system comprising, in combination with suitable inlets and outlets:

a cooling tower;

a heat-exchanger;

an electrolytic cell; and

at least one filter.

In a further aspect, the invention is directed to a method for concentrating waste water, comprising feeding said waste water to a cooling tower, causing a side stream taken from the recirculating stream to pass through an electrolytic cell, removing solids precipitating by the action of said cell, and remixing said treated side stream with the main stream, before feeding them to the cooling tower.

According to a preferred embodiment of the invention the treated side stream leaving the electrolytic cell is further filtered to remove carried over solids. A preferred filter for this purpose is a sand filter with backwash, but of course other suitable filters will be recognized by the skilled engineer.

All the above and other characteristics and advantages of the invention will be better understood through the following illustrative and non-limitative description of preferred embodiments thereof.

Brief Description of the Drawing

- Fig. 1 schematically shows a cooling tower arrangement according to a preferred embodiment of the invention.

Detailed Description of Preferred Embodiments

The invention will now be illustrated with reference to Fig. 1. Specific operational data will be provided below, for the purpose of illustration, it being understood that any values are given as exemplary values, in order to better illustrate the invention, but the invention is of course not limited to any particular operating conditions. In the figure, numeral 1 indicates the cooling tower, which operates with a make-up feed, MU, which in the example is 15 m^3/hr. The MU stream may contain a high content of organic contaminants, such as a stream having a chemical

oxygen demand (COD) of about 500 - 1000 ppm. It should also be noted that the COD may, at peak values, exceed 2000 ppm. When the COD increases, it is desirable to employ non-oxidizing biocides, e.g., chlorinated phenol, to assist in reducing and preventing biofouling. This, as will be apparent to the skilled person, is a concentration by far higher than acceptable according to the prior art. Still, when operating according to the invention, this high concentration does not constitute a problem, and the cooling tower may handle it without any problem.

The cooling tower of the invention operated, according to this specific example, with a recycle ratio R= 1,200 m^3/hr. A reservoir 2 contains a solution of hypochlorite (10-12% NaClO, Redox potential = 300 - 400 mV, feed rate up to about 15 lit/hr), and a second reservoir, 3, contains a phenolic or non-oxidizing biocide, e.g., quaternary amines, triazolin, DBNPA (dibromonitrilproprionamide) or MIT (methyl izothiazolinone) which can be added as needed, e.g., when the Redox potential reaches below 200 mV.

It should be noted that the Redox potential range of 300 - 400 mV is not arbitrary, since above 400 mV corrosion problems begin, and below 300 mV the danger of biofouling becomes substantial.

Water is then passed through a heat exchanger 4, which servers one or more users, and is then sent to the cooling tower. A side stream, 5, which

in this specific example is in the range of 100 - 250 m^3/hr, is sent to treatment, while the main stream 6 proceeds to the cooling tower. Side stream 5 is fed first to an electrolytic cell 7, operating at 600 A x 10 V, and then to a filter, 8, where precipitates are filtered off. The precipitates are obtained mainly as a result of the electrolytic process in cell 7, which causes scale to precipitate, including salts and organic matter. Electrodeposition of scale on the cathode surface takes place, due to the alkaline environment existing in its vicinity, as well as electro-coagulation and flocculation of dispersed organic and inorganic materials. Of course, the anode causes oxidation and generation of oxychloro compounds, as well as the generation of O_3 and OH^- in the water, which are by themselves useful biocides, and these species function as biocides in the system.

A bleed is effected in both the electrolytic cell 7 (blow down stream BD1) and in the filter (blow down stream BD2) 30 m^3/day, and the treated water, stream 9, is then mixed with the main stream 6. The Redox potential of the mixed stream 10 should usually be in the range of 300 - 400 mV, but with low CODs lower values, down to 150 mV, can also suffice. Water flowing in the cooling tower is partially evaporated, as schematically indicated by evaporation stream EV. The amount of water evaporated is, in the example given, about 300 m^3/day, and must in general be the difference between the make-up stream, MU, and the sum of blow down streams BD1+BD2. "RX" is a Redox potential controller, and

11 is the control circuit for operating the biocides 2 and 3 inlets, e.g., through pumps (not shown).

When operating according to the invention, water in the system is maintained constantly clean, typically having the following parameters: Turbidity < 10 NTU; Total Hardness = 400 - 600 ppm; Ca Hardness = 150 ppm; Total Alkalinity = 200 - 400 ppm; Total Count = 10^3 - 10^5 IFU/ml, with no sulphate reducing bacteria (SRB), without fungi, molds and yeast.

The water used to provide the make-up stream MU can be of any industrial or urban impure source, and may contain organic contaminants, which are considered as unsuitable for cooling tower water, according to the known art. Of course, the MU stream must be treated, prior to use, to remove undesirable matter therefrom, such as solids or biological matter, e.g., bacteria. The desirable parameters do not exceed COD = 20 ppm and total suspended solids (TSS) < 20 ppm.

As explained in WO 99/16715, using the electrolytic cells in the water system, under appropriate conditions, achieves a combined effect of scale removing and disinfecting. According to the present invention, however, additional effects, such as electrocoagulation and electroflocculation are also exploited.

An electrolytic cell for the treatment according to the present invention can be, e.g., a unit which comprises a liquid container having at least one liquid inlet and one liquid outlet, e.g., a pipe, further comprising at least one cathode and one anode placed within said liquid container, said cathode and anode being in electrical contact with the "-" and "+" poles of a direct current source, respectively. Said liquid inlet is connected to stream 5 of Fig. 1, and said liquid outlet is connected to filter 8.

In contrast to the use made in WO 99/16715, in which no chemicals are added, the present invention requires the use of at least hypochlorite. Furthermore, the invention permits to employ water having a conductivity of 3,000 μS or higher, up to about 6,000 μS, without causing any substantial increase in corrosion. A typical pH for operating under these conditions is pH ≈ 8.5 - 9. In this specification "μS" indicates the μSiemens unit (which equals $\mu\Omega^{-1}$). It should be noted that current standards, in cooling towers employing chemicals, is not greater than 3,000 μS, and often as low as 2,000 μS.

The present invention can be carried out by means of any electrolytic cell. An example of such a cell is described, e.g., in Whitten et al., "General Chemistry with Qualitative Analysis", Saunders College Publishing, 4th ed., pp. 12-13.

A water treatment device according to the present invention can be in a form such as that described in WO 99/16715, or any other suitable device. An example of operating conditions for the illustrative cooling tower described above is as follows:

- 6 electrolytic cells with a diameter of 50 cm each and 110 cm height.
- Each cell contains 5 anodes and 5 cathodes, of 10 cm x 100 cm each.
- The current (100 - 110 A) x (8 - 10 V).
- 10 sand filters with counter-current flush, 90 cm diameter x 60 cm
- Counter-current flushing effected every 12 hours with 12 - 16 m^3 of water.
- Heat Output: 1,200 m^3/hr x 7°C. Operating 4 - 5°C above the wet temperature.

  T_{in} = 35°C; T_{out} = 28°C; T_{bulk} = 24°C.

The above description and examples have been provided for illustrative purposes only, and are not intended to limit the invention in any way. It will be apparent to the skilled person that many modifications, variations and adaptations may be made to the invention by persons skilled in the art, without departing from the spirit of the invention or exceeding the scope of the claims.

CLAIMS:

1. A method of operating a cooling tower, comprising feeding to said cooling tower a make-up stream of water containing organic and/or biological contaminants, causing a side stream taken from the recirculating stream to pass through an electrolytic cell, removing solids precipitating by the action of said cell, and remixing said treated side stream with the main stream, before feeding them to the cooling tower.

2. A method according to claim 1, further comprising oxidizing the recirculating water by the addition of an oxidizing material.

3. A method according to claim 2, wherein the oxidant is added in an amount suitable to maintain the Redox potential at the inlet of the cooling tower in the range of about 300 - 400 mV.

4. A method according to claim 2 or 3, wherein the oxidant is selected from among NaClO, TCCA, BCDMH, Br_2 and Cl_2.

5. A method according to any one of claims 1 tp 4, further comprising adding a non-oxidizing biocide to the recirculating stream as an aid in the prevention of biofouling.

6. A method according to claim 5, wherein the biocide is added when the Redox potential decreases to a value of about 200 mV or less.

7. A method according to claim 5 or 6, wherein the biocide is selected from among phenolic biocides, quaternary amines, triazolin, DBNPA (dibromonitrilproprionamide), MIT (methyl izothiazolinone) or MBT.

8. A method according to any one of claims 1 to 7, wherein the COD of the make-up stream is between about 500 and over 2,000 ppm.

9. A method according to claim 8, wherein the COD of the make-up stream is between 500 and 1000 ppm.

10. A method according to any one of claims 1 to 9, wherein the Redox potential of the stream entering the cooling tower is in the range 300 - 400 mV.

11. Cooling tower system comprising, in combination with suitable inlets and outlets:

- a cooling tower;
- a heat-exchanger;
- an electrolytic cell; and
- at least one filter.

12. A method for concentrating waste water, comprising feeding said waste water to a cooling tower, causing a side stream taken from the recirculating stream to pass through an electrolytic cell, removing solids precipitating by the action of said cell, and remixing said treated side stream with the main stream, before feeding them to the cooling tower.

13. A method according to claim 12, wherein the treated side stream leaving the electrolytic cell is further filtered to remove carried over solids.

14. A method according to claim 13, wherein the filter is a sand filter, with backwash.

15. A method of operating a cooling tower, essentially as described and illustrated.

16. A method for concentrating wastewater, essentially as described and illustrated.

Abstract

A method of operating a cooling tower comprises feeding to the cooling tower a make-up stream of water containing organic and/or biological contaminants, causing a side stream taken from the recirculating stream to pass through an electrolytic cell, removing solids precipitating by the action of the cell, and remixing the treated side stream with the main stream, before feeding them to the cooling tower.

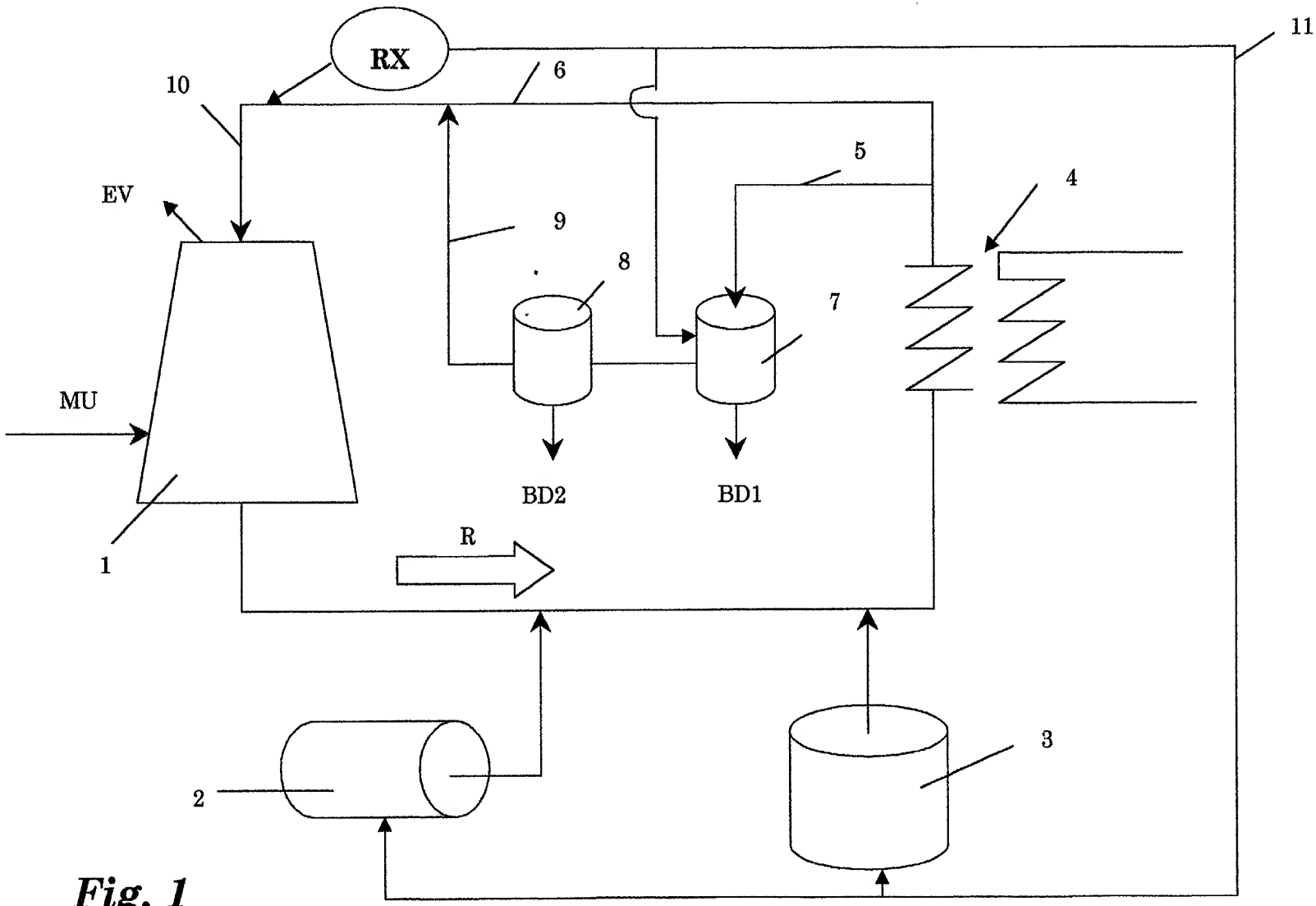


Fig. 1

Attorney Docket No. 9124.118US01

MERCHANT & GOULD P.C.

United States Patent Application

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: WATER TREATMENT METHOD AND APPARATUS

The specification of which
a. ☒ is attached hereto
b. ☒ was filed on September 6, 2000 as application serial no. _____ and was amended on (if applicable) (in the case of a PCT-filed application) described and claimed in international no. filed and as amended on (if any), which I have reviewed and for which I solicit a United States patent.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56 (attached hereto).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

a. ☐ no such applications have been filed.
b. ☒ such applications have been filed as follows:

FOREIGN APPLICATION(S), IF ANY, CLAIMING PRIORITY UNDER 35 USC § 119			
COUNTRY	**APPLICATION NUMBER**	**DATE OF FILING (day, month, year)**	**DATE OF ISSUE (day, month, year)**
ISRAEL	131848	9-SEPTEMBER-1999	
ALL FOREIGN APPLICATION(S), IF ANY, FILED BEFORE THE PRIORITY APPLICATION(S)			
COUNTRY	**APPLICATION NUMBER**	**DATE OF FILING (day, month, year)**	**DATE OF ISSUE (day, month, year)**

I hereby claim the benefit under Title 35, United States Code, § 120/365 of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

U.S. PROVISIONAL APPLICATION NUMBER	DATE OF FILING (Day, Month, Year)

I hereby appoint the following attorney(s) and/or patent agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

Albrecht, John W.	Reg. No. 40,481
Ali, M. Jeffer	Reg. No. 46,359
Anderson, Gregg I.	Reg. No. 28,828
Batzli, Brian H.	Reg. No. 32,960
Beard, John L.	Reg. No. 27,612
Berns, John M.	Reg. No. 43,496
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Karjeker, Shaukat	Reg. No. 34,049
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Kettelberger, Denise	Reg. No. 33,924
Keys, Jeramie J.	Reg. No. 42,724
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Larson, James A.	Reg. No. 40,443
Leon, Andrew J.	Reg. No. P-46,869
Liepa, Mara E.	Reg. No. 40,066
Lindquist, Timothy A.	Reg. No. 40,701
Lycke, Lawrence E.	Reg. No. 38,540
McAuley, Steven A.	Reg. No. 46,084
McDonald, Daniel W.	Reg. No. 32,044
McIntyre, Jr., William F.	Reg. No. 44,921
Mueller, Douglas P.	Reg. No. 30,300
Pauly, Daniel M.	Reg. No. 40,123
Phillips, Bryan K.	Reg. No. P-46,990
Phillips, John B.	Reg. No. 37,206
Plunkett, Theodore	Reg. No. 37,209
Prendergast, Paul	Reg. No. 46,068
Pytel, Melissa J.	Reg. No. 41,512
Qualey, Terry	Reg. No. 25,148
Reich, John C.	Reg. No. 37,703
Reiland, Earl D.	Reg. No. 25,767
Schmaltz, David G.	Reg. No. 39,828
Schuman, Mark D.	Reg. No. 31,197
Schumann, Michael D.	Reg. No. 30,422
Scull, Timothy B.	Reg. No. 42,137
Sebald, Gregory A.	Reg. No. 33,280
Skoog, Mark T.	Reg. No. 40,178
Spellman, Steven J.	Reg. No. 45,124
Stoll-DeBell, Kirstin L.	Reg. No. 43,164
Sumner, John P.	Reg. No. 29,114
Swenson, Erik G.	Reg. No. 45,147
Tellekson, David K.	Reg. No. 32,314
Trembath, Jon R.	Reg. No. 38,344
Tuchman, Ido	Reg. No. 45,924
Underhill, Albert L.	Reg. No. 27,403
Vandenburgh, J. Derek	Reg. No. 32,179
Wahl, John R.	Reg. No. 33,044
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Merchant & Gould P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2	**Full Name Of Inventor**	**Family Name** ITZHAK	**First Given Name** David	**Second Given Name**
0	**Residence & Citizenship**	**City** Omer	**State or Foreign Country** ISRAEL	**Country of Citizenship** ISRAEL
1	**Post Office Address**	**Post Office Address** 32 Rotem Street	**City** Omer	**State & Zip Code/Country** 84965/ISRAEL
Signature of Inventor 201:			**Date:**	

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application:

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

S/N unknown

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Itzhak, David	Serial No.:	unknown
Filed:	concurrent herewith	Docket No.:	9124.118US01
Title:	WATER TREATMENT METHOD AND APPARATUS		

CERTIFICATE UNDER 37 CFR 1.10
'Express Mail' mailing label number: EL674896816US
Date of Deposit: September 6, 2000
I hereby certify that this correspondence is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C . 20231.

By: Linda McCormick
Name: Linda McCormick

COMMUNICATION REGARDING CHANGE OF CORRESPONDENCE ADDRESS

Assistant Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Dear Sir:

In connection with the above-identified application, please send all correspondence to the following address:

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903

Respectfully submitted,

MERCHANT & GOULD P.C.
P. O. Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300

Dated: September 6, 2000

By
Gregory A. Sebald
Reg. No. 33,280

GAS/rw